AMENDMENTS TO THE CLAIMS

This listing of claims replaces all prior versions and listings of claims in the application:

Listing of Claims:

Claim 1. (Currently amended) A process for application of powder coatings to conductive and non-conductive surfaces comprising

a) covering the surface with material with a layer thickness of 0.1 to 10 µm which material absorbs high-energy radiation within a wavelength range of 250 to 2,500 nm, wherein the material is selected from the group consisting of carbon, magnetite, iron oxide, iron oxide black, tin oxide and antimony oxide and

b) applying a powder coating composition to the covered surface and melting and curing the applied powder coating composition with NIR radiation ~~within the wavelength range of 250 to 2,500 nm~~ for 0.5 to 60 seconds;
whereby the material covering the surface absorbs radiation within said wavelength range of 250 to 2,500 nm.

Claim 2. (canceled)

Claim 3. (previously presented) The process according to claim 1 wherein the material is carbon.

Claim 4. (canceled)

Claim 5. (canceled)

Claim 6. (previously presented) The process according to claim 1 wherein the covering step is realized with a layer thickness in the range of 0.5 to 1 µm.

Claim 7. (original) The process according to claim 1 wherein step (b) follows immediately after step (a).

Claim 8. (currently amended) The process according to claim 1 wherein NIR irradiation at a wavelength between 800 and 1200 nm is ~~being~~ provided by a NIR radiation emitter having an incandescent filament with a surface temperature between 2000 K and 3500 K that is used to melt and cure the coating composition.

Claim 9. (withdrawn) A process for application of powder coatings to conductive and non-conductive surfaces comprising

a) covering the surface with material which absorbs high-energy radiation within a wavelength range of 250 to 2,500 nm and has heating rates of more than 50°C per second, wherein the material is selected from the group consisting of carbon, graphite, magnetite, iron oxide, iron oxide black, tin oxide and antimony oxide and

b) applying a powder coating composition to the covered surface and melting and curing the applied powder coating composition with a combination of NIR radiation and UV radiation wherein the NIR radiation melts and cures the powder coating and the UV radiation further cures the powder coating.

Claim 10. (original) The process according to claim 1 wherein the surface is selected from the group of metal substrates, transparent organic and inorganic substrates and temperature sensitive substrates.

Claim 11. (previously presented) The process according to claim 10 wherein the surface is the surface of a thick metal substrate having a thickness of 3 mm or more.

Claim 12. (canceled)

Status of the Claims

Claims 1, 3, 6-8, 10 and 11 are pending.

Claims 1 and 8 have been amended.

Claims 3, 6 and 11 were previously presented.

Claims 7 and 10 are original claims.

Claim 9 has been withdrawn.

Claims 2, 4, 5 and 12 have been canceled.

Claims 1,3,6-8 and 10-11 were rejected under 35 U.S.C. 112.

Claims 1, 3, 7-8 and 10-11 were rejected under 35 U.S.C. 103(a).

Rejection – 35 USC § 112

Claims 1, 3, 6-8 and 10-11 were rejected under 35 U.S.C. 112 , first paragraph as failing to comply with the written description requirement on the basis that the claims contained subject matter not described within the specification. Amended claim 1 clearly points out that NIR radiation is used to melt and cure the powder coating composition and that the material covering the surface absorbs radiation within the wavelength range of 250-2,500 nm. The remaining claims are either directly or indirectly dependent on claim 1. The amendment to claim 1 should obviate the '112 rejection and the rejection should be withdrawn.

Rejection – 35 USC § 103

Claims 1, 3, 7-8 and 10-11 were rejected under 35 U.S.C. 103(a) as being unpatentable over Applicant's admitted state of the art in view of Blatter et al. (WO 99/41323) *hereinafter* "Blatter", further in view of Nickerson (US 3,860,506), *hereinafter* "Nickerson", and further in view of Dalton (US 3,263,604) *hereinafter* "Dalton" and further in view of Honda et al. (US 6,800,374) *hereinafter* "Honda".

One of the objections raised by the Examiner was that the claimed process parameters were meaningless without reciting the particulars of the process parameters such as coating thickness. The critical process parameters have been

set forth in the amended claims. The thickness of the material in step (a) has been provided. Support for this amendment is on page 4, line 7. The time that the coating substrate is exposed to NIR radiation is provided and the high energy wave length absorption level of the covering material of step (a) has been set forth as well as the group of covering materials that can be used. The main points of Applicants' process have been clearly set forth and are not taught by the cited references.

Further, the Examiner stated that it would have been obvious to one of ordinary skill in the art at the time the invention was made to have determined the optimum values of the relevant process parameter (including those of the claimed invention) in the cited art through routine experimentation depending on particular application in the absence of showing of criticality.

Applicants have pointed out the criticality of the covering layer of carbon applied to the substrate before the application and curing of the powder coating. Table 1 (page 8 of the specification) summarizes the test results wherein a powder coating was applied and cured on an aluminum sheet without the covering layer to that of an aluminum sheet having a carbon covering layer that then was coated with a powder coating and cured (the invention). The aluminum sheet having the carbon covering layer (the invention) provided a coating with superior adhesion, improved appearance (measured by flow), excellent impact resistance, had a shorter curing time and had superior flow properties in comparison to the powder coated aluminum sheet that did not have the carbon covering layer. These test results clearly illustrate the criticality of having the covering layer of carbon present which is not taught by the cited references.

The Examiner's comments concerning Nickerson are totally irrelevant since Nickerson is directed to the use of graphite to form a conductive surface. Applicants claims clearly **do not** include graphite. Furthermore, Applicants' process requires that the covering layer of step (a) remain as a layer of the powder coated substrate. The Nickerson process clearly removes the graphite layer on sintering of the coated berylia tube where it is stated that the graphite particles were substantially completely removed by exposure to the sintering temperature of 1700C and carried away by the flow of hydrogen atmosphere (See Nickerson col. 9, lines 37-53).

The admitted state of the art in the specification (page 2, lines 4-10) points out that coating non-conductive substrates with powder coating is difficult due to the insufficient grounding of the substrate and that the deposition of a powder coating is uneven and adhesion to the substrate is poor and that it is known to pretreat based substrates with a liquid conductive primer. Obviously, this does not disclose or suggest Applicants' invention as set forth in the amended claims which requires a first layer of constituents which are not taught, followed by the application of a powder coating and subsequent curing with NIR which also is not taught in the state of the art.

Furthermore, there is no disclosure or suggestion in this admitted state of the art or Blatter that would lead one to apply a first layer of a material that is either carbon, magnetite, iron oxide black, tin oxide or antimony oxide as has been set forth in the amended claims. These materials, as an applied first layer on a substrate, are not taught nor is the concept of applying a first layer suggested by Blatter or the state of the art. Nickerson discloses the use of a graphite layer to improve adhesion. Graphite has been deleted in the amended claims since this is the only constituent that was disclosed by Nickerson.

Blatter simply discloses a process for applying a powder coating composition to substrates including temperature sensitive substrates and curing with NIR radiation but does not disclose or suggest the use of the first layer of material set forth in the amended claims. As pointed out in the specification, this first layer provides a shortened melting and curing time of the powder coating and the powder coating melts to provide a smooth and uniform surface coating. As discussed above, Table 1 (specification page 9) clearly shows the surprising and unexpected results that occur when using a first coating of carbon in comparison to the prior art such as Blatter that does not use a first coating. Further, Applicants' process can be used on a wide variety of substrates, metallic, non metallic, conductive, non-conductive, temperature sensitive and insensitive substrates. (See specification page 3, line 6-14).

Nickerson is directed to forming a conductive coating on non-conductive substrates and this conductive coating is based on **graphite** which is the **only** material disclosed by Nickerson. In the Nickerson process the conductive coating

(graphite) is coated onto a substrate and the substrate is heated to a high sintering temperature of, for example, 1700°C for more than 4 hours (temperature is raised from ambient to 1700°C in 20 minutes and is maintained at this temperature for 4 hours) and during the process the graphite coating is removed by the hydrogen atmosphere (See Nickerson, col. 9, lines 37-60). In contrast, in Applicants' process, the first layer remains on curing of the powder coating. Nickerson discloses a conductive coating but is in combination with a totally different process which utilizes sintering at high temperatures for long periods of time which would obviously destroy any heat sensitive substrate, such as, wood or plastic. One of the particular advantages of Applicants' process is that it can be used on such substrates. Further, Nickerson is directed to the application of zirconium oxide – yttrium oxide protective coatings and not organic powder coatings as set forth in the specification page 5, lines 20-31. Therefore, one skilled in the art would not select this solution taught by Nickerson to apply powder coatings and cure them with NIR.

Further, Nickerson only teaches the use of graphite and the particular constituents set forth in Applicants' amended claims are not taught or suggested by Nickerson. The claims have been amended to specifically exclude graphite. In view of the above discussion, one skilled in the art would not logically combine the teachings of Nickerson and Blatter to arrive at Applicants' claimed invention. Even if the combination were made which is not taught or suggested by either references, one still would not arrive at Applicants' claim process but a process that requires the sintering and removal of the graphite layer. Such sintering at high temperatures would destroy any temperature sensitive substrate used in such a process. In contrast, Applicants' by the use of the particular constituents of the first layer, as set forth in the claims, with NIR curing can use their process of a variety of substrates and in particular temperature sensitive substrates.

Dalton is directed to the formation of electro-responsive blanks comprising a backing and a conductive coating and is not directed to powder coatings or in particular to Applicants' process for the application of powder coatings to substrates or the application of a first high energy absorbing material containing a select group of materials as set forth in the claims and then applying a powder coating thereto and curing with NIR radiation for a set period of time. Dalton suggests that carbon black or graphite can be incorporated into the paper of the backing of the electro-

responsive blank but does not teach or suggest that carbon can be used as a high energy absorbing material that can be used in conjunction with a powder coating to form a cured powder coating on a substrate that has excellent adhesion, smoothness, impact resistance and flexibility. Dalton merely shows that graphite and carbon black can be equivalent for use in a paper backing for electro-responsive blanks but that does not mean that they are the same for use in the Nickerson process particularly when Nickerson only teaches the use of graphite. Furthermore, as clearly pointed out above, Nickerson's sintering process is not remotely related to the process set forth in Applicants' amended claims. Applicants' invention is directed to a powder coating application process that comprises steps a) and b) which require specific conditions to provide a powder coating with superior properties by the application of NIR radiation for a set period of time which is not taught nor suggested by Dalton nor by Nickerson nor by the other references cited nor by the combination of these references.

Honda is totally irrelevant to Applicants' invention since Honda is directed to forming a cleaning tape and has no relation to the application of a powder coating composition which is Applicants' claimed invention. Honda simply shows adjusting the thickness of a carbon layer forming a magnetic layer or a electro-conductive layer. In contrast, the first layer applied in Applicants' process is a layer that absorbs NIR radiation and is not applied as a magnetic or electro-conductive layer. Honda is not directed to a process for applying a powder coating to a substrate that has been coated with a material as set forth in the amended claims that improves the physical properties of the powder coating layer and reduces the curing time using NIR radiation. Honda is irrelevant to Applicants' claimed process and should be withdrawn.

A prima facie case for obvious has not been made since the cited references to not show, teach or suggest all of the parameters of Applicants' claimed process and the obviousness rejection based on the state of the art, Blatter, Nickerson, Dalton and Honda needs to be withdrawn and the claims allowed.